

## Knauf Bullet-Resistant Partitions

W161.de – Knauf Bullet-Resistant Partition FB4

### Note on English translation / Hinweise zur englischen Fassung

This is a translation of the System Data Sheet valid in Germany.

All stated details and properties are in compliance with the regulations of the German standards and building regulations. They are only applicable for the specified products, system components, application rules, and construction details in connection with the specifications of the respective certificates and approvals.

Knauf Gips KG denies any liability for applications outside of Germany as this requires changes acc. to the respective national standards and building regulations.

Dies ist eine Übersetzung des in Deutschland gültigen Detailblattes. Alle angegebenen Werte und Eigenschaften entsprechen den in Deutschland gültigen Normen und bauaufsichtlichen Regelungen. Sie gelten nur bei Verwendung der angegebenen Produkte, Systemkomponenten, Anwendungsregeln und Konstruktionsdetails in Verbindung mit den Vorgaben der bauaufsichtlichen Nachweise.

Die Knauf Gips KG lehnt jegliche Haftung für Einsatz und Anwendung außerhalb Deutschlands ab, da in diesem Fall eine Anpassung an nationale Normen und bauaufsichtliche Regelungen notwendig ist.



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## Notes on the document

Knauf system data sheets are the planning and application basis for planners and professional installers with the application of Knauf systems. The contained information and specifications, constructions, details and stated products are based, unless otherwise stated, on the certificates of usability (e.g. National Technical Test Certificate (e.g. abP) valid at the date they are published as well as on the applicable standards. Additionally, design and structural requirements and those relating to building physics (fire resistance and sound insulation) are considered.

The contained construction details are examples and can be used in a similar way for various cladding variants of the respective system. At the same time, the demands made on fire resistance and/or sound insulation as well as any necessary additional measures and/or limitations must be observed.

## References to other documents

### System data sheets

- [Knauf Metal Stud Partitions W11.de](#)
- [Knauf Burglar-Retardant Partitions W11RC.de](#)

### Technical Information

- [Fastening of loads to Knauf Wall and Ceiling Systems VT03.de](#)

### Folders

- [Fire resistance with Knauf BS1.de \(German only\)](#)
- [Sound insulation and room acoustics with Knauf \(only sections in English\)](#)

### Product data sheets

- Observe the product data sheets of the individual Knauf system components

## Symbols in the system data sheet

The following symbols are used in this document:

### Insulation layers

- ⓐ Mineral wool insulation layer acc. to EN 13162  
Non-combustible  
(insulating material, e.g. from Knauf Insulation)

### Legend symbols

- 1 Legend number that will be explained when used

## Intended use of Knauf Systems

Please observe the following:

<b>Caution</b>	Knauf systems may only be used in the applications as described in the Knauf documents. In case third-party products or components are used, they must be recommended or approved by Knauf. Flawless application of products / systems assumes proper transport, storage, assembly, installation and maintenance.
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## Notes on fire resistance

When installing partitions, where there are demands made on the fire resistance, the reinforcing and supporting flanking components must at least feature the same fire resistance class.

## Installation zones acc. to DIN 4103-1

### Installation zone 1

Partitions in rooms where low numbers of persons gather, e.g. dwellings, hotels, office and hospital rooms including corridors and halls or similar.

### Installation zone 2

Partitions in rooms where large numbers of persons gather, e.g. meeting halls, school classrooms, auditoria, exhibition halls and sales rooms as well as rooms with a similar use.

Unless otherwise stated, the value in the table is the maximum permissible partition height for installation zone 2.

## Construction notes

### Movement joints

Movement joints of the main structure should be integrated into the construction of the burglar-bullet-resistant partitions. Movement joints are to be installed about every 15 m on continuous partitions.

## Notes on sound insulation

$R_w$  = Weighted sound reduction index in dB without sound transmission via flanking building components

## General notes on Knauf systems

### Term definitions

Resistance class FB4 covers the largest handgun calibre tested acc. to DIN EN 1522, the 44 Remington Magnum, as well as all lower resistance classes. For assignment to a resistance class, the test object may not be fully penetrated when hit by a projectile of the corresponding ammunition calibre. The suffix "S" or "NS" indicates whether splintering occurred during the test. "NS" indicates non-splintering.

Knauf FB4 bullet resistant partitions have been designated to resistance class FB4 NS in acc. to EN 1522 after testing by the Beschussamt Ulm (State ballistics office in Ulm) in Germany.

### Application areas

The specifications in this system data sheet only apply for bullet-resistant partitions in interiors. Bullet-resistant partitions offer security where there is a need for increased protection. Examples include:

- Banks
- Protection of persons
- Embassies
- Police stations
- Military installations
- Public buildings
- VIP areas
- Panic rooms

**Proof of Usability**

Knauf system	Fire resistance	Sound insulation	Structural engineering	Bullet resistant
W161.de	AbP P-3310/563/07-MPA BS	Knauf sound insulation proof L 001-07.05	AbP P-1405/928/10-MPA BS	S 04 137 05 / B

The stated constructional and structural properties, and characteristic building physics of Knauf systems can solely be ensured with the exclusive use of Knauf system components, or other products expressly recommended by Knauf. The validity and up-to-datedness of the stated proofs have to be considered.

**Notes on fire resistance**

The specifications marked with **plus** offer additional application options, which are not directly included in the Proof of Usability. On the basis of our technical assessments, we assume that these marked design solutions can be assessed as a non-significant divergence. On request, we can make the documentation on which this assessment is based, such as experts opinions or technical assessments, available to you together with the Certificate of Usability. We recommend that a non-significant divergence be coordinated and authorised in advance in consultation between the persons responsible for fire resistance and/or the relevant authorities.

**Classification and requirements**
**Classification and requirements for testing with handguns and rifles**

Extract from the DIN EN 1522, February 1999

Class	Type of weapon	Caliber	Ammunition		Ballistic parameters		W161.de Range up to FB4
			Type	Weight g	Test distance m	Projectile velocity m/s	
FB1	Rifle	22LR	L/RN	2.6 ± 0.1	10 ± 0.5	360 ± 10	
FB2	Handgun	9 mm Luger	FJ <sup>1)</sup> /RN/SC	8.0 ± 0.1	5 ± 0.5	400 ± 10	
FB3	Handgun	357 Magnum	FJ <sup>1)</sup> /CB/SC	10.2 ± 0.1	5 ± 0.5	430 ± 10	
FB4	Handgun	357 Magnum 44 Remington Mag	FJ <sup>1)</sup> /CB/SC	10.2 ± 0.1	5 ± 0.5	430 ± 10	
			FJ <sup>2)</sup> /FN/SC	15.6 ± 0.1	5 ± 0.5	440 ± 10	
FB5	Rifle	5.56 x 45	FJ <sup>2)</sup> /PB/SCP1	4.0 ± 0.1	10 ± 0.5	950 ± 10	
FB6	Rifle	5.56 x 45	FJ <sup>2)</sup> /PB/SCP1	4.0 ± 0.1	10 ± 0.5	950 ± 10	
		7.62 x 51	FJ <sup>1)</sup> /PB/SC	9.5 ± 0.1	10 ± 0.5	830 ± 10	
FB7	Rifle	7.62 x 51	FJ <sup>2)</sup> /PB/HC1	9.8 ± 0.1	10 ± 0.5	820 ± 10	

■ FJ = full metal jacket

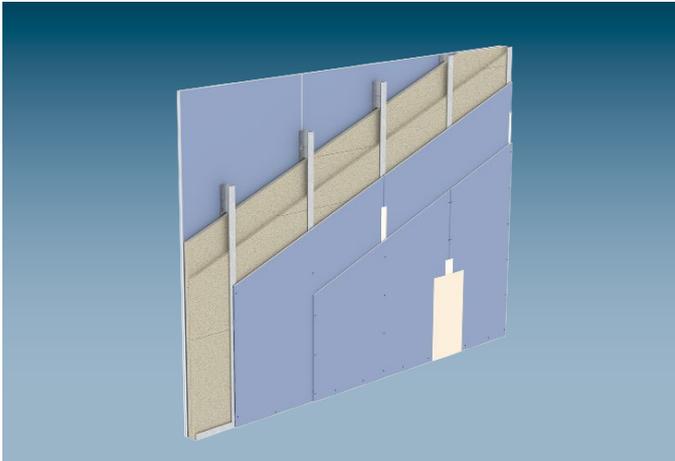
- 1) Steel
- 2) Copper

### Knauf Bullet-Resistant Partitions FB4 NS

Knauf bullet-resistant partitions FB4 NS consist of a metal substructure as a single stud partition, a double layer of special gypsum board Knauf Torro in the partition cavity and double layer cladding made of Knauf Diamant Boards on both sides.

The stud frame is anchored all around to the flanking constructional components.

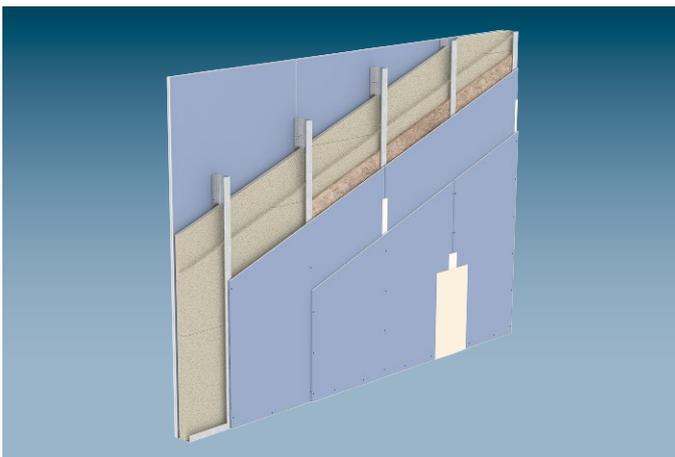
#### W161.de Single metal stud frame CW 75 – FB4 NS



The Knauf bullet-resistant partition **W161.de** consists of a single metal stud frame CW 75, a double layer of special gypsum fibre board Knauf Torro in the partition cavity and double sided cladding layer made of Diamant Boards on both sides.

- Particularly slimline system
- Partition heights up to: 6.40 m
- Weighted airborne sound insulation index  $R_w$  up to: 49.7 dB
- Fire resistance class up to: F90 (one and a half hours)

#### W161.de Single metal stud frame CW 100 with insulation layer – FB4 NS



The bullet-resistant partition **W161.de** consists of a single metal stud frame CW 100, a double layer of special gypsum fibre board Knauf Torro in the partition cavity as well as a layer of insulation material to improve the sound insulation and double sided cladding layer made of Diamant Boards on both sides.

- Good sound insulation
- Partition heights up to: 8.55 m
- Weighted airborne sound insulation index  $R_w$  up to: 56.7 dB
- Fire resistance class up to: F90 (one and a half hours)

### System variants

Scheme drawings

Knauf system	Fire resistance class	Cladding per wall side		Weight	Wall thickness	Profiles Knauf CW	Sound insulation	
		Minimum Thickness	Without Insulation layer				Insulation layer	Sound reduction index
	Diamant	t mm	Approx. kg/m <sup>2</sup>	D mm	h mm	mm	R <sub>w</sub> dB	
<b>W161.de Bullet-resistant partition</b>				Single metal stud frame CW 75, double-layer cladding + Knauf Torro				
	F90	<ul style="list-style-type: none"> <li>• 2x 12.5 + in the wall cavity</li> <li>• Knauf Torro 2x 28 mm</li> </ul>	139	125	75	–	49.7	
<b>W161.de Bullet-resistant partition</b>				Single metal stud frame CW 100 (with insulation layer), double-layer cladding + Knauf Torro				
	F90	<ul style="list-style-type: none"> <li>• 2x 12.5 + in the wall cavity</li> <li>• Knauf Torro 2x 28 mm</li> </ul>	139	150	100	20 <sup>1)</sup>	56.7	

**Demands on the insulation layer** (Insulation materials, e.g. from Knauf Insulation)

- Required for fire resistance: None
- Fire protection permissible: Mineral wool **G**
- 1) Required for sound insulation reasons: Mineral wool **G** length-related flow resistance acc. to EN 29053:  $r \geq 5 \text{ kPa} \cdot \text{s/m}^2$

### Partition heights

**Maximum permissible wall heights** Installation zones 1 and 2

Knauf profile	Stud spacing a mm	Knauf W161.de Knauf bullet-resistant partition	
		Without fire resistance m	With fire resistance m
Metal gauge 0.6 mm			
CW 75	625	6.40	6.40
CW 100	625	8.55	7.00

### Ball impact safety

Ball impact safety acc. to DIN 18032-3



#### Extension of the fire resistance Proof of Usability

- Due to Knauf Torro in partition cavity  
Prior consultation is recommended acc. to page 5.

#### Note

Observe the notes on page 4.

### Fixing loads

#### Up to 40 kg – Knauf Multi-Purpose Screws FN

With direct screw fastening in the cladding

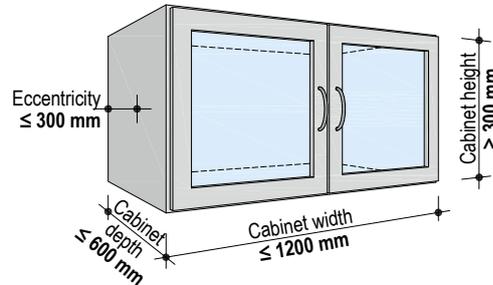
Cladding thickness mm	Knauf Universalschraube (Multi-Purpose Screw)	Maximum screw load capacity Diamant kg
2x 12.5	FN 4.3 x 35	40

### Cantilever loads

- According to DIN 18183-1, stud partitions can be loaded at any position by cantilever loads (e.g. TVs, wall cupboards).
- Consideration of the cantilever arm (cabinet height  $\geq 300$  mm) and eccentricity ( $\leq 300$  mm at cabinet depth  $\leq 600$  mm) is required.
- Cantilever loads must be attached using at least 2 Knauf Multi-Purpose Screws FN.
- Determine the minimum number of screws using the cabinet weight and loading of the cladding thickness (see calculation examples below).

- Spacing of fasteners for Knauf Multi-Purpose Screw FN acc. to DIN 18183-1:  $\geq 75$  mm; (Knauf recommendation for approach to the full loadbearing capacity at  $\geq 250$  mm).
- Observe the permissible cantilever load of the wall system.

#### Wall mounted cabinet:



#### Type and usage of the fasteners

Light objects:

- e.g. Picture frames and mirrors up to 40 kg (2x 12.5 mm Diamant) per screw using Knauf Multi-Purpose Screws FN.

### Rating examples

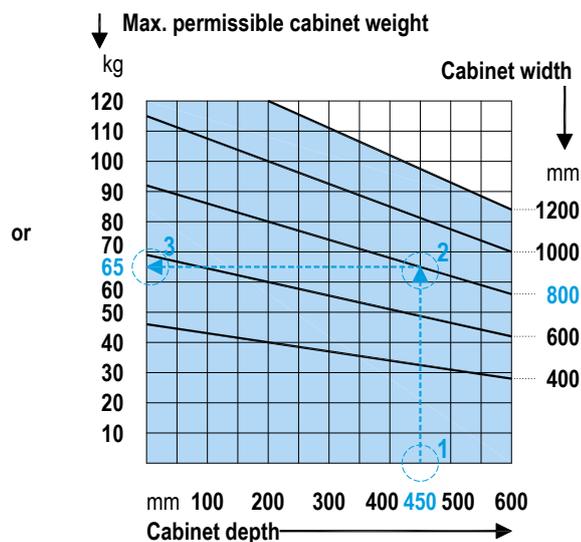
Up to 0.7 kN/m (70 kg/m) wall length: Cladding thickness  $\geq 2x 12.5$  mm Diamant

Maximum permissible cabinet weight (kg) acc. to table

Cabinet width mm	Cabinet depth mm					
	100	200	300	400	500	600
400	43	40	37	34	31	28
600	64.5	60	55.5	51	46.5	42
800	86	80	74	68	62	56
1000	107.5	100	92.5	85	77.5	70
1200	129	120	111	102	93	84

Assume the worst-case value with intermediate values or use the diagram procedure.

Max. permissible cabinet weight (kg) according to diagram



Calculation examples – Determination of the permissible cabinet weight as well as the necessary minimum number of dowels for Knauf Multi-Purpose Screw FN (always  $\geq 2$ )

#### According to table

- 0.7 kN/m permissible cantilever load
  - Cabinet depth 400 mm, cabinet width 1000 mm
  - Cladding thickness 2x 12.5 mm, Knauf Multi-Purpose Screw FN 4.3 x 35
- Required number of screws:  $85 \text{ kg} : 40 \text{ kg} = 2.13$

- Maximum cabinet weight: **85 kg** (see table above)
- Maximum screw load: **40 kg** (see table above)
- **At least 3 Knauf Multi-Purpose Screws FN** are required

#### According to the diagram

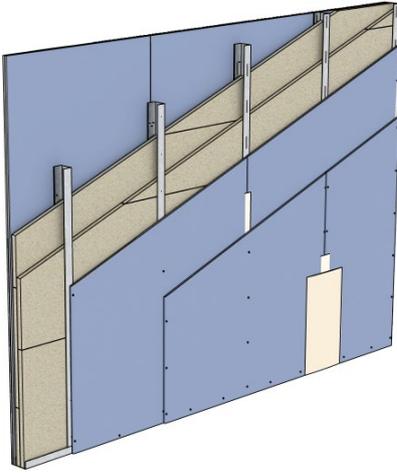
- 0.7 kN/m permissible cantilever load
  - Cabinet depth 450 mm, cabinet width 800 mm
  - With cabinet depth 450 mm **1** vertically upwards, up to the cabinet width line 800 mm **2** at the intersection point horizontal to the left – read off value **3**:
  - Cladding thickness 2x 12.5 mm, Knauf Multi-Purpose Screw FN 4.3 x 35
- Required number of screws:  $65 \text{ kg} : 40 \text{ kg} = 1.63$

- Maximum cabinet weight: **65 kg** (see diagram above)
- Maximum screw load: **40 kg** (see table above)
- **At least 2 Knauf Multi-Purpose Screws FN** are required

#### Details

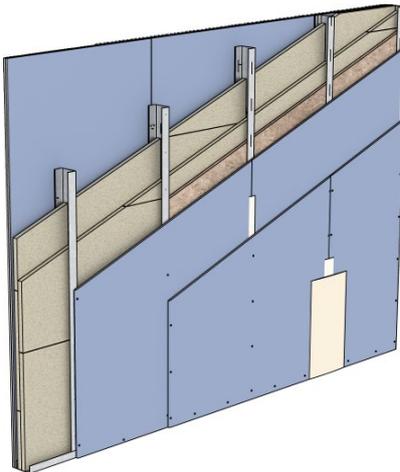
##### W161.de-P1 Vertical board layer

2x 12.5 mm Diamant + 2x 28 mm Knauf Torro



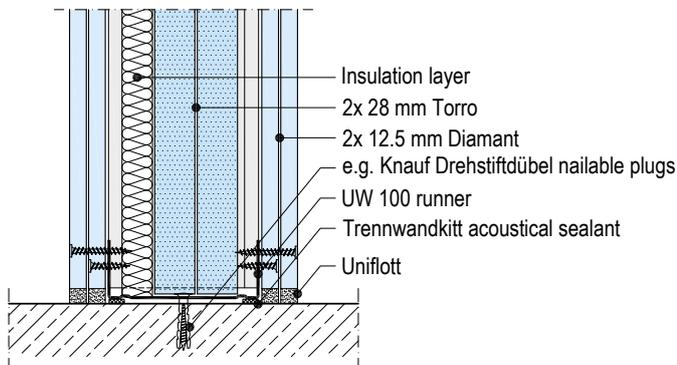
##### W161.de-P11 Vertical board layer

2x 12.5 mm Diamant + 2x 28 mm Knauf Torro+ insulation layer



##### W161.de-VU11 Connection to basic floor

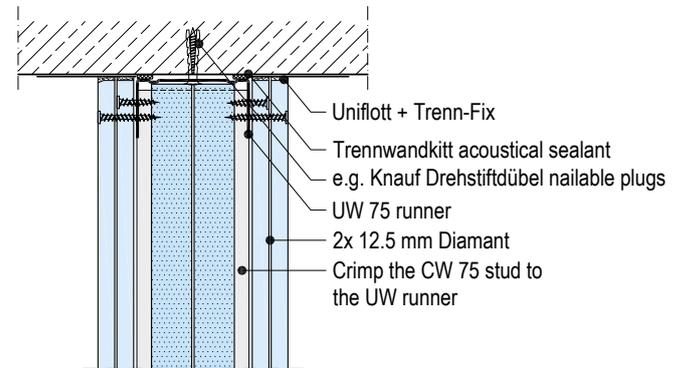
Vertical section



**plus** Extension of the fire resistance proof of usability  
Prior consultation in acc. to page 5 recommended

##### W161.de VO1 Ceiling connection to basic ceiling

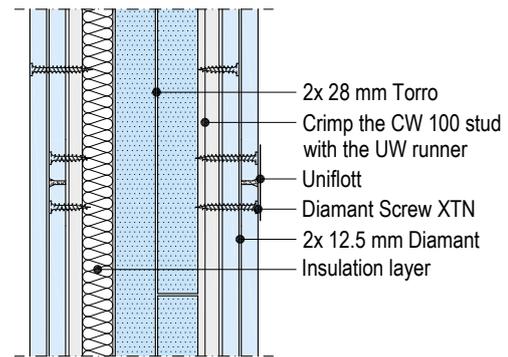
Vertical section



**plus** Extension of the fire resistance proof of usability  
Prior consultation in acc. to page 5 recommended

##### W161.de-VM11 Board joint

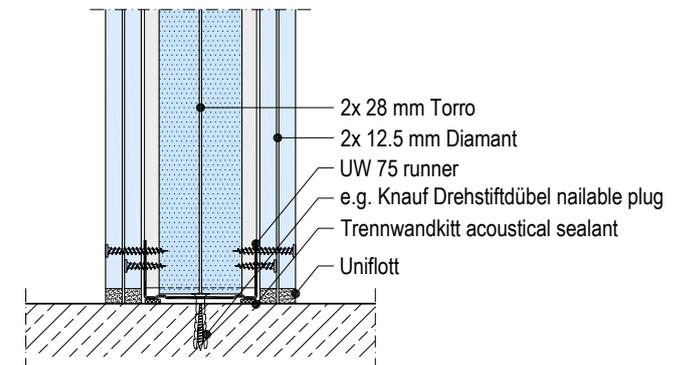
Vertical section



**plus** Extension of the fire resistance proof of usability  
Prior consultation in acc. to page 5 recommended

##### W161.de-VU1 Connection to basic floor

Vertical section



**plus** Extension of the fire resistance proof of usability  
Prior consultation in acc. to page 5 recommended

#### Note

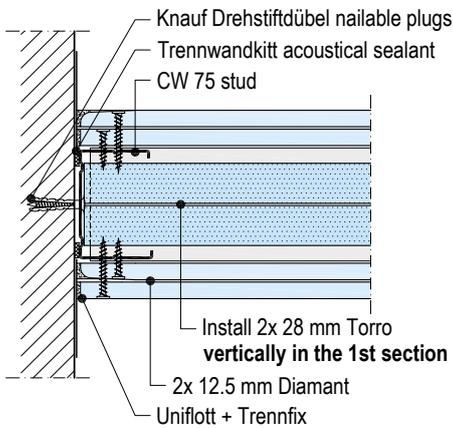
Door and window openings must be applied after consultation with the manufacturers. The stud frame in the opening area must be structurally rated for the load applied by Knauf Torro (84 kg/m<sup>2</sup>).

Details

Scale 1:5

W161.de-A1 Connection to wall – 1st section

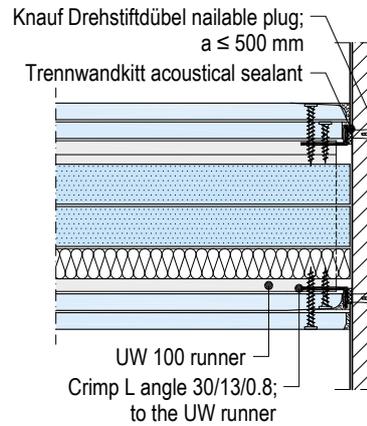
Horizontal section



**plus** Extension of the fire resistance proof of usability  
Prior consultation in acc. to page 5 recommended

W161.de-A12 Connection to wall – last section

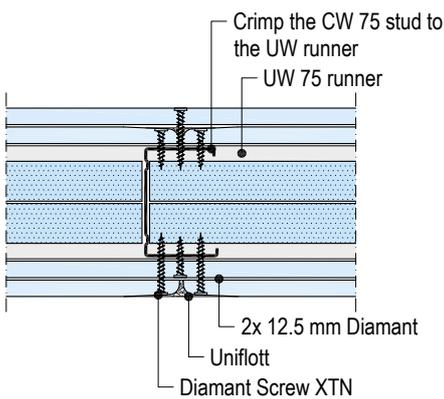
Horizontal section



**plus** Extension of the fire resistance proof of usability  
Prior consultation in acc. to page 5 recommended

W161.de-B1 Board joint

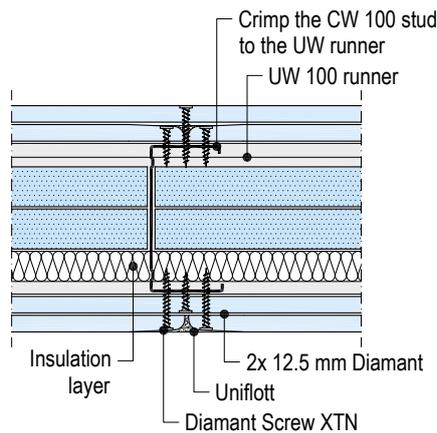
Horizontal section



**plus** Extension of the fire resistance proof of usability  
Prior consultation in acc. to page 5 recommended

W161.de-B11 Board joint

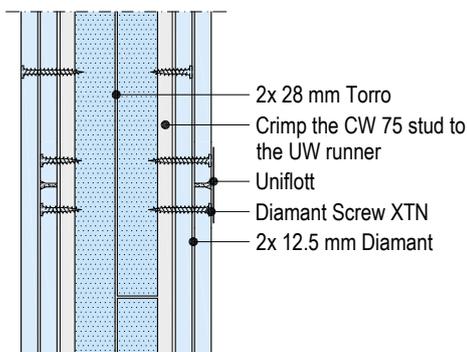
Horizontal section



**plus** Extension of the fire resistance proof of usability  
Prior consultation in acc. to page 5 recommended

W161.de-VM1 Board joint

Vertical section

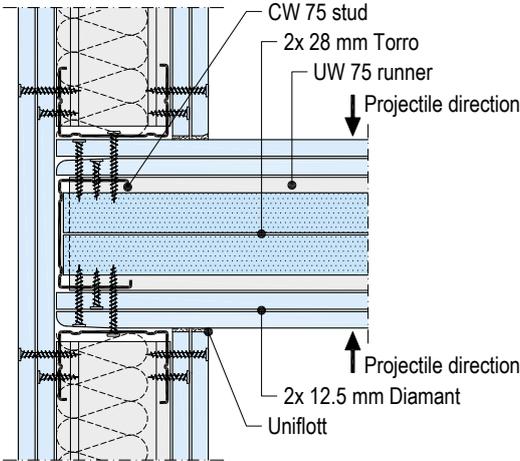


**plus** Extension of the fire resistance proof of usability  
Prior consultation in acc. to page 5 recommended

**Note** Door and window openings must be applied after consultation with the manufacturers. The stud frame in the opening area must be structurally rated for the load applied by Knauf Torro (84 kg/m<sup>2</sup>).

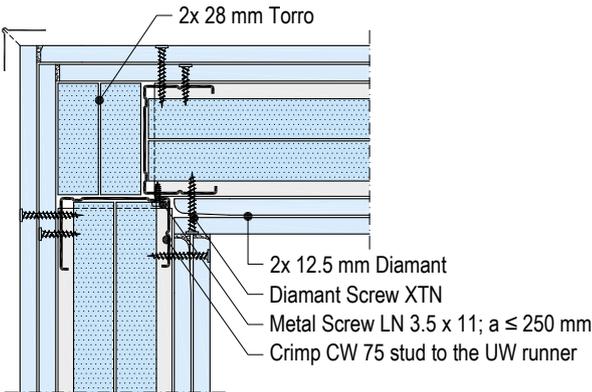
Details

W161.de-A3 Connection to wall – metal stud partition



**plus** Extension of the fire resistance proof of usability  
Prior consultation in acc. to page 5 recommended

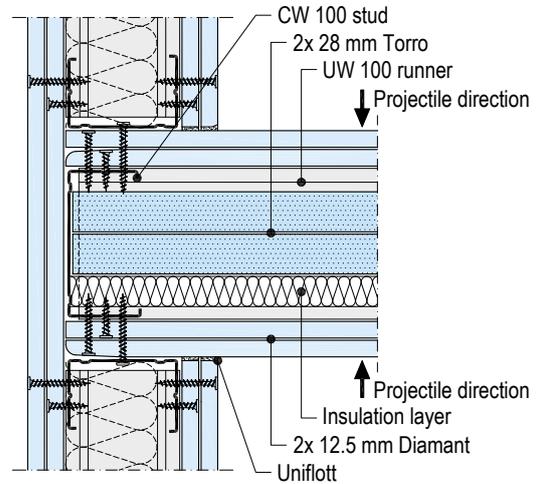
W161.de-D1 Corner



**plus** Extension of the fire resistance proof of usability  
Prior consultation in acc. to page 5 recommended

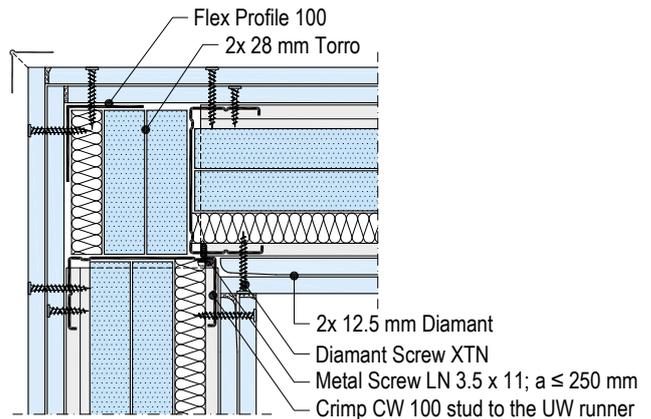
Horizontal section | Scale 1:5 | Dimensions in mm

W161.de-A13 Connection to wall – metal stud partition



**plus** Extension of the fire resistance proof of usability  
Prior consultation in acc. to page 5 recommended

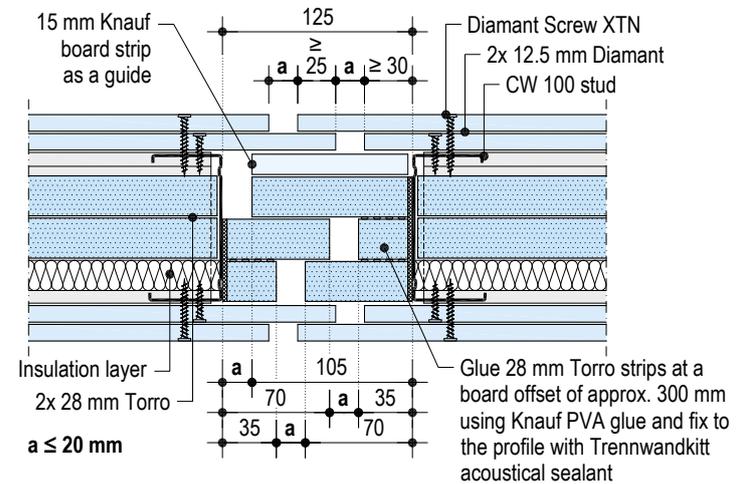
W161.de-D11 Corner



**plus** Extension of the fire resistance proof of usability  
Prior consultation in acc. to page 5 recommended

W161.de-BFU11 Movement joint CW 100

Without fire resistance



Single side installation

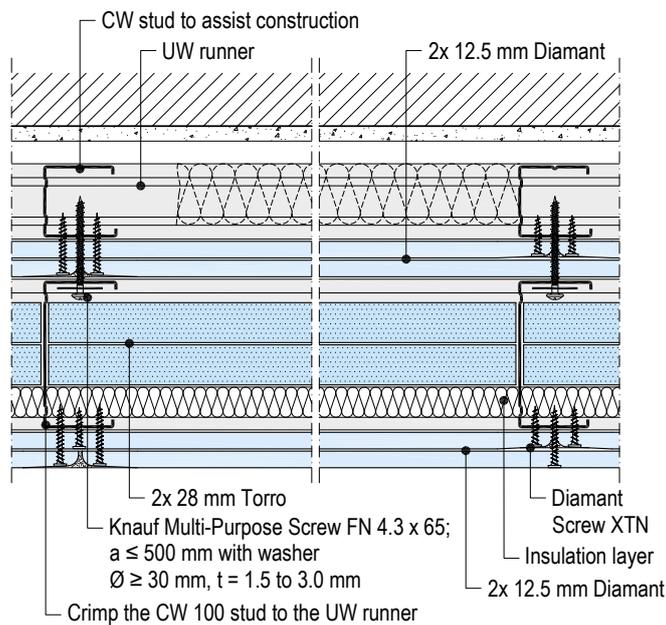
In existing structures, it may be necessary to upgrade existing walls that do not feature a bullet-resistant classification or whose classification is insufficient using a Knauf bullet-resistant partition FB4 W161.de For the purpose, an auxiliary construction made of stud profiles is erected before the existing wall on which the cladding layers facing away from the room are attached. Subsequent further construction design is implemented in accordance with the respective system specifications of the W161.de and taking the following details into consideration.

Detail

Scale 1:5

W161.de-SO10 Single side installation before existing wall CW 100

Horizontal section



**plus** Extension of the fire resistance proof of usability  
Prior consultation in acc. to Page 5 recommended

Security wall design (burglar-retardant)

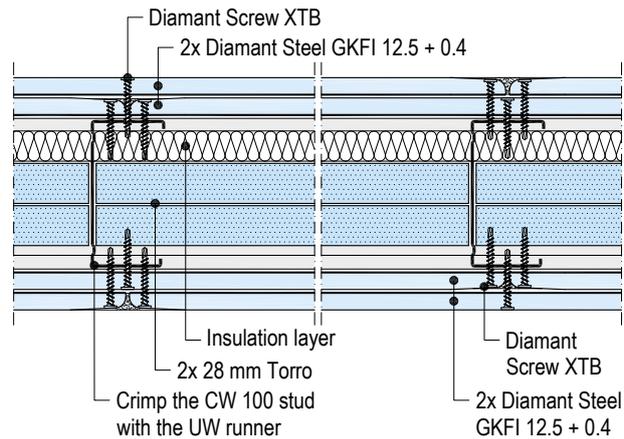


Construction as a security wall (burglar-retardant) possible, minimum stud profile strength CW 100. Depending on the design in classes N acc. to VdS 2534 / RC2 acc. to DIN EN 1627 and class A acc. to VdS 2534 / RC3 acc. to DIN EN 1627 possible.

Preferred variants

- RC2: 1x Diamant Steel GKFI + 1x Diamant
- RC3: 2x Diamant Steel GKFI

Scheme drawing



Note

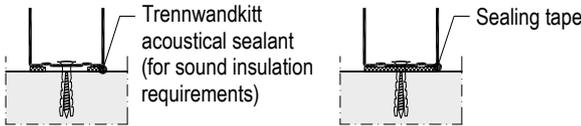
A reduction of the maximum permissible spacings of the fasteners according to system data sheet W11RC.de must be observed.

For further information on planning and design see system data sheet [Knauf Burglar-Retardant Partitions W11RC.de](http://Knauf Burglar-Retardant Partitions W11RC.de)

### Grid

#### General

Apply a suitable sealant to the rear side of runners for the connection to flanking constructional components. Ensure a carefully applied seal for sound insulation requirements analogue to the specifications of the DIN 4109-33:2016-07 section 4.1.1.3 (e.g. Trennwandkitt acoustical sealant)



Fix wall perimeter runners to the floor and ceiling. Anchor wall perimeter runners with suitable dowels to flanking walls. Use suitable spacings and fasteners in accordance with the following table.

Use suitable fasteners

- Solid flanking constructional components: Knauf Drehstiftdübel nailable plugs with masonry or Knauf Deckennagel ceiling steel dowels with reinforced concrete.
- Non-solid flanking constructional components: Use anchors specially suited to the materials.

#### Maximum permissible fastener spacings

##### Without fire resistance

#### Supporting fastening perimeter runner (UW) connection to basic floor and basic ceiling

Partition height m	Knauf Ceiling Steel Dowels (with reinforced concrete) 1x mm	Knauf Drehstiftdübel nailable plugs 1x (one and a half hours) mm
≤ 3.00	1000	1000
> 3.00 to ≤ 5.00	1000	500
> 5.00 to ≤ 6.50	500	500
> 6.50 to ≤ 8.55	500	–

- Constructional anchoring of the wall connection profiles (CW) to the flanking walls at centres of 1000 mm (at least 3 anchoring points), with partition height > 5.00 m at spacing of max. 500 mm.

#### Maximum permissible fastener spacings

##### With fire resistance

#### Supporting fastening perimeter runner (UW) connection to basic floor and basic ceiling

Partition height m	Knauf Ceiling Steel Dowels (with reinforced concrete) 1x (one and a half hours) mm	Knauf Drehstiftdübel nailable plugs 1x (one and a half hours) mm
≤ 3.00	1000	1000
> 3.00 to ≤ 5.00	1000	500
> 5.00 to ≤ 6.50	500	500
> 6.50 to ≤ 7.00	500	–

- Constructional anchoring of the wall connection profiles (CW) to the flanking walls at centres of 1000 mm (at least 3 anchoring points), with partition height > 5.00 m at spacing of max. 500 mm.

Knauf recommendation: Use floor-to-ceiling profiles.

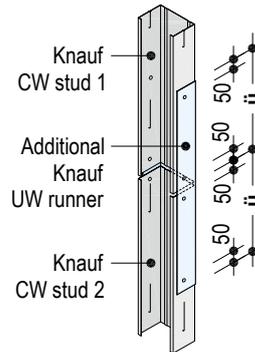
#### Profile extensions

Scheme drawings | Dimensions in mm

- Stagger the heights of the profile joints (alternating upper and lower wall half).
- With fire protection requirements a maximum of 2 profile joints per stud is permitted.

#### Variant 3

2 CW profiles butt jointed, connected with additional UW runner.



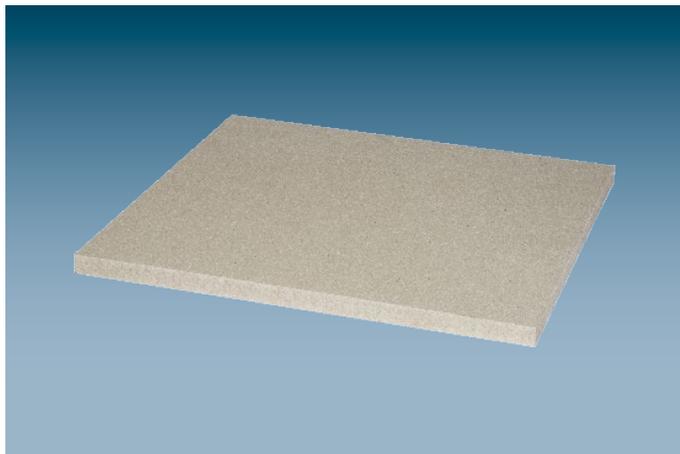
Rivet, screw fix or, if possible, crimp the profiles in the overlapping area.



#### Profile extensions

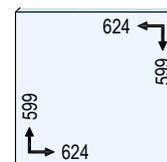
Knauf profiles	Overlap ü
CW 75	≥ 750 mm
CW 100	≥ 1000 mm

### System components gypsum fibre board Knauf Torro



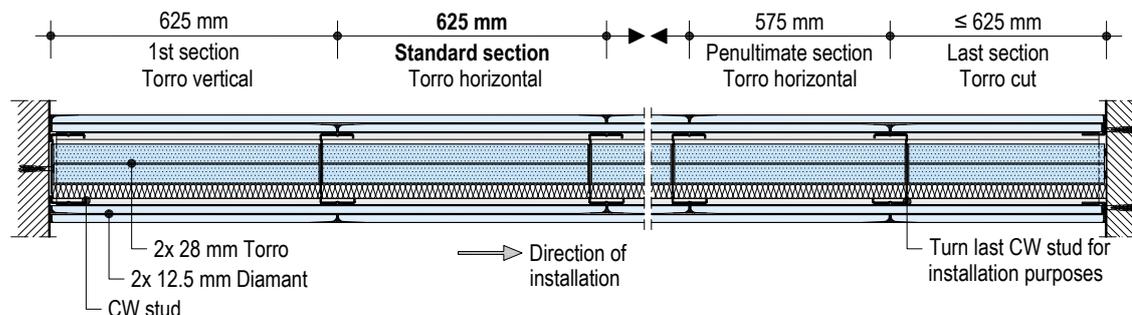
Bullet-resistant safety of the partition system is achieved by using the high-strength, highly-compressed gypsum-fibre board Knauf Torro in the partition cavity. Two layers of 28 mm thick board ensure that a calibre 44 Remington Magnum projectile when fired stays embedded at half way, in other words, between both board layers. The reason for this is the strength of the board along with the simultaneous ductility (deformability) of the material. This leads to the absorption of the kinetic energy of the projectile by plastic deformation of the projectile itself as well as the plastic deformation yield of the board material along the entry hole.

- Format 624 x 599 mm
- Thickness 28 mm
- High stability gypsum fibre materials
- Density  $\geq 1500 \text{ kg/m}^3$
- Double-layer in partition cavities



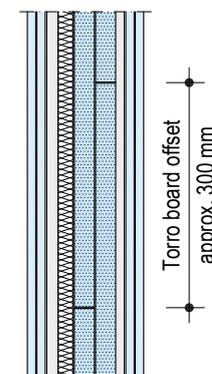
### Installation of Knauf Torro

#### Horizontal section

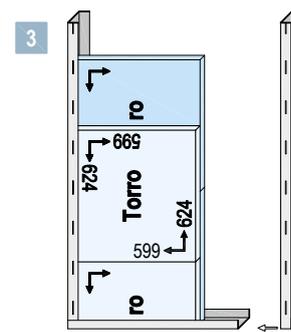
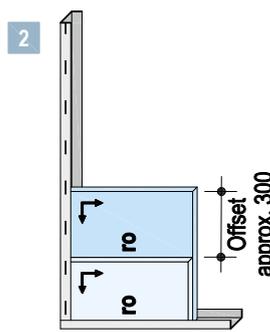
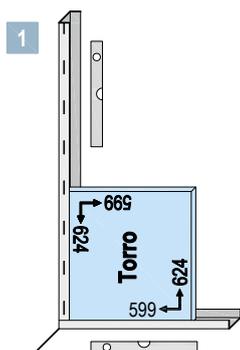
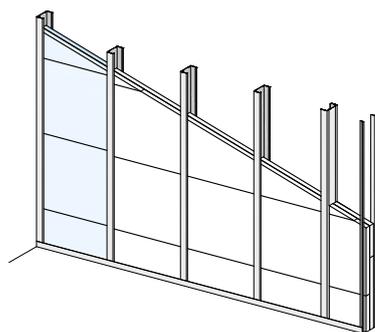


#### Scheme drawings

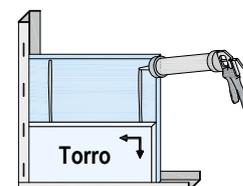
#### Vertical section



#### Installation 1st section

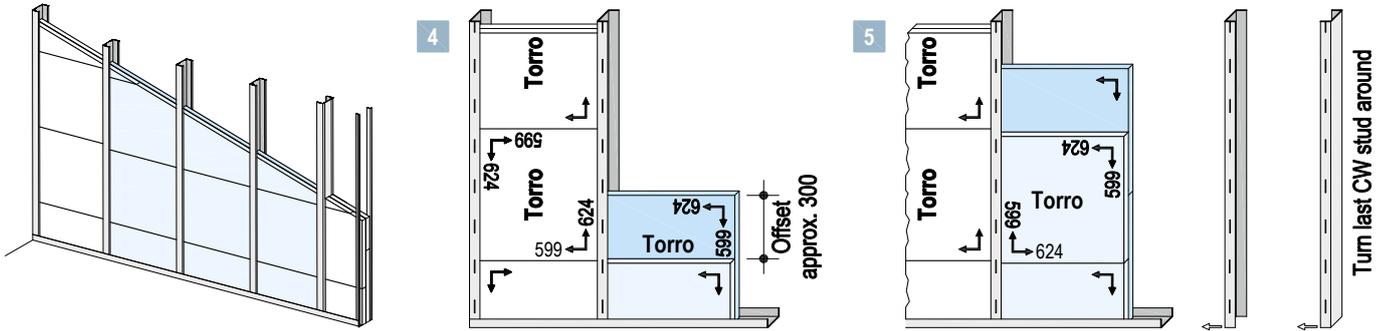


- 1 Apply Acoustical Sealant to the CW Stud to fasten the first Knauf Torro to be installed, slide in the board (width 599 mm) vertically and push firmly onto the CW Stud (tap with a rubber mallet if necessary).
- 2 Subsequently apply the second layer that is about 300 mm shorter in height and fix it to the board already applied by 2 strings of Trenwandkitt acoustical sealant (using screw clamps).
- 3 Apply the subsequent Knauf Torro according to the "building block approach" and stagger by approx. 300 mm to one another. Fix both board layers to one another using Trenwandkitt acoustical sealant (see scheme on right) and press them firmly onto the CW stud. Cut and install the top Knauf Torro layer to take account of the remaining height. Place the CW stud (apply a string of Trenwandkitt acoustical sealant to the centre lap of the profile channel) with the lap pointing towards the Torro boards in the UW Runner and crimp it with the stud crimper. Apply a further string of Trenwandkitt acoustical sealant in the centre of the profile lap on the side of the next installation section.



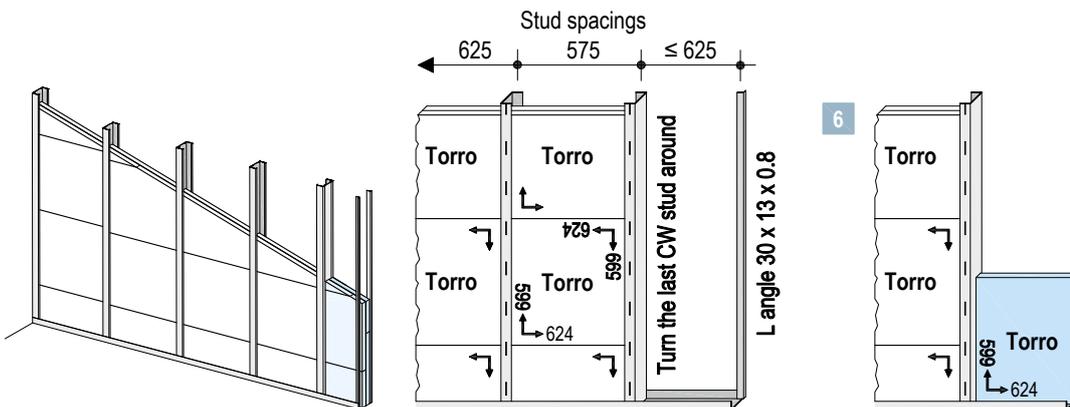
### Installation of Knauf Torro (continued)

#### Installation of standard section (2nd Section up to the penultimate section)



- 4 From the 2nd. installation section, set Knauf Torro horizontally (width 624 mm) into the profile, and to ensure grid spacing of 625 mm, continue to observe the joint stagger (approx. 300 mm). Install the stud partition as detailed under 3.
- 5 Continue with the installation sequence until all sections have been applied with 2x 28 mm Knauf Torro.  
**Caution:** Turn the last CW stud around to position the opening towards the boards!

#### Installation of final section



- 6 Fixing of the last partition field is undertaken with a Knauf L-Angle 30x13x0.8. Set the first bracket on the UW runner (apply Trennwandkitt acoustical sealant beforehand) and crimp it, then fasten the short, perforated leg at spacings of approx. 500 mm to the flanking constructional component. Apply a gypsum board section (approx. 40 x 40 x 12.5 mm) between the angle and Knauf Torro at a spacing of approx. 1 m and glue in with Trennwandkitt acoustical sealant, apply precisely cut Knauf Torro boards, and push them into the corresponding angle leg and align and fasten the second angle on the opposite partition side also on the UW runner flanges.

#### Notes

Apply CW Studs and Knauf Torro board-to-stud!

With a CW 100 stud frame:

In order to correctly apply the Knauf Torro boards in the partition cavity, insert a gypsum board spacer (approx. 40 x 40 x 12.5 mm) with Trennwandkitt acoustical sealant between the CW stud flange and Knauf Torro at spacings of approx. 1 m and press on the Knauf Torro board on the respective flange side. Jam in a roof batten section (or doubled up gypsum board sections) for support on the opposite flange side between the profile flange and Knauf Torro board (remove with installing the insulation layer or before cladding the partition).

Door and window openings must be applied after consultation with the manufacturers. The stud frame in the opening area must be structurally rated for the load applied by Knauf Torro (84 kg/m<sup>2</sup>).

Knauf Torro boards can be cut to size with an electrical circular saw equipped with a dust extractor. (Saw blade, e.g. from Knauf Integral Material no. 186326)

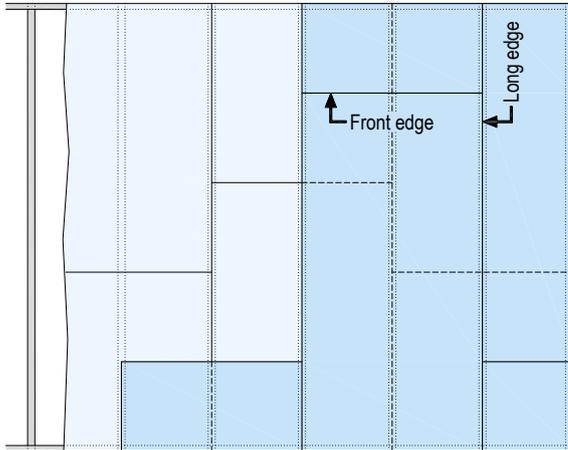
### Application scheme

#### Board layers

Scheme drawing

#### Board layers vertical

- Board width: 1250 mm
- Stud spacing: 625 mm



#### Lower/upper layer:

- Stagger the long edge joints by at least one stud spacing and arrange on the studs.
- If floor-to-ceiling boards are not used, stagger the front edge joints  $\geq 400$  mm in a cladding layer.
- Stagger the front edge joints between board cladding layers in case of multi-level cladding (approx. 250 mm).
- Front and long edge joints of cladding on opposing sides must also be staggered to one another.

### Fastening of the cladding to the stud frame with Knauf drywall screws

#### Fasteners to be used

Dimensions in mm

Cladding	Metal stud frame (penetration $\geq 10$ mm)	
	Metal gauge $s \leq 0.7$ mm Diamant Screws XTN	Metal gauge $0.7 \text{ mm} < s \leq 2.25$ mm Diamant Screws XTB
2x 12.5	XTN 3.9 x 23 + 3.9 x 38	XTB 3.9 x 38 + 3.9 x 55

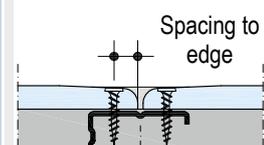
#### Maximum fastener spacings, all board layers fastened to frame with screws

Dimensions in mm

Cladding	1 layer	2nd layer
	Vertical Board width 1250	Vertical Board width 1250
2-layers	750	250

#### Note

For optimum sound insulation arrange the screws as far as possible from the profile lap, i.e. with minimum spacing from edge (10 mm edge covered with board liner, 15 mm cut edge).



Arrange board joint on centre of profile flange.

### Jointing

Jointing of the boards in the required quality level Q1 to Q4 in accordance with Code of Practice no. 2 "Verspachtelung von Gipsplatten, Oberflächengüten" <sup>1)</sup>.

Fill in visible screw heads.

#### Suitable jointing materials

- Uniflott  
Hand filling without joint tape strips in the long joint edges
- Uniflott impregnated  
Hand filling of impregnated boards without joint tape in the long edge joints, water-repellent, matching green colour
- Fugenfüller Leicht  
Hand filling with joint tape, preferably with Knauf Fugendeckstreifen Kurt joint tape

#### Suitable finish filling compounds

- Q2, application by hand  
Uniflott, Uniflott imprägniert, Fill & Finish Light, Super Finish
- Q3/Q4, application by hand  
Spritzspachtel Plus, Super Finish, Fill & Finish Light
- Q3/Q4, machine application  
Spritzspachtel Plus (preferably Q3)

#### Jointing of the gypsum board joints

For multi-layer cladding, fill the lower layers with filler; fill the joints of the visible layer. Filling the joints of covered cladding layers with multi-layer cladding is necessary to ensure technical fire protection and sound insulation properties as well as the structural properties.

#### Recommended

Front edge and cut edge joints as well as mixed joints (e.g. HRAK half-rounded tapered edge + cut edge) of the visible cladding layers filled using Uniflott with Fugendeckstreifen Kurt joint tape as well.

#### Joint filling of the connection joints

Apply Trenn-Fix or Fugendeckstreifen Kurt joint tape when filling joints to adjacent drywall constructions, taking into consideration the conditions and requirements for crack resistance.

Observe code of practice no. 3 "Gipsplattenkonstruktionen - Fugen und Anschlüsse" (German only) <sup>1)</sup>.

Apply Trenn-Fix when filling joints to adjacent solid or wooden construction components.

#### Sanding

Lightly sand visible surfaces after drying of the filler material, if required.

#### Application temperature/climate

Filling and covering of joints should only take place when no more longitudinal changes can be expected, i.e. expansion or contraction due to humidity or temperature changes.

Do not apply filling at room or substrate temperatures below approx. +10 °C.

In case of mastic asphalt screed, cementitious screed and self-levelling screed, fill board joints only after screed has been applied.

Observe code of practice no. 1 "Baustellenbedingungen" <sup>1)</sup>.

1) Issued by the German Bundesverband der Gipsindustrie e. V.

Quality levels	Joint implementation Long edges half-rounded tapered edge/ half-rounded edge	Joint implementation Front edge bevelled cut edge	Description Working steps
Q1			<ul style="list-style-type: none"> <li>■ Fill joints with Uniflott or Uniflott imprägniert</li> <li>■ Fill the visible parts of the fastener</li> </ul>
Q2			<ul style="list-style-type: none"> <li>■ Preliminary jointing in acc. with quality level Q1</li> <li>■ Finish (fine finish compound) to achieve a smooth transition to the board surface e.g. with Uniflott, Uniflott imprägniert, Spritzspachtel Plus, Fill &amp; Finish Light or Super Finish</li> </ul> <p>No application marks or ridges may remain visible. Sand off the areas concerned if necessary.</p>
Q3			<ul style="list-style-type: none"> <li>■ Jointing in acc. with quality level Q2</li> <li>■ Wide jointing of the joints as well as clean and accurate removal of the remaining board liner filling the pores, e.g. with Fill &amp; Finish Light, Super Finish or Spritzspachtel Plus</li> </ul> <p>If necessary, i.e. physical ridges and grooves are not acceptable and must be sanded.</p>
Q4			<ul style="list-style-type: none"> <li>■ Jointing in acc. with quality level Q2</li> <li>■ Complete surface covering of skim coat with a layer thickness of at least 1 mm, e.g. with Fill &amp; Finish Light, Super Finish or Spritzspachtel Plus</li> </ul>

### Coatings and linings

Coating / lining	Recommended finish Gypsum boards EN 520
Tiles etc.	Q1
Coarsely structured wallpaper (e.g. wood-chip wallpaper)	Q2
Finely structured wallpaper	Q3/Q4
Matt textured coats	Q3/Q4
Glossy, smooth coats	Q4
Plasters (grain size < 1 mm)	Q3/Q4
Plasters (grain size ≥ 1 mm)	Q2

#### Pretreatment

Before a further coating or lining is applied, the filled surface must be free of dust. Prime acc. to code of practice no. 6 of the BVG "Vorbehandlung von Trockenbauflächen aus Gipsplatten zur weitergehenden Oberflächenbeschichtung bzw -bekleidung" <sup>1)</sup>.

The primer must suit the subsequent coating compound/coatings/linings.

In order to compensate for the differences in absorption of surfaces, coatings of primer such as Knauf Tiefengrund primer is suitable.

Where a wallpaper lining is used, a primer that facilitates easier removal of wallpaper for redecoration is recommended.

Sealing primer Flächendicht is required for covering splash water areas with tiles. Observe the DIN 18534.

<b>Note</b>	Gypsum board surfaces that have constantly been exposed to light without any protection can result in yellowing. Therefore, a trial coat is recommended that will extend across several boards including all joints. Yellowing can, however, be successfully avoided only by using a special primer, e.g. Aton Sperrgrund for finishing plasters, Knauf Sperrgrund for coatings.
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#### Suitable coatings and linings

The following coatings/linings can be applied to Knauf boards:

- Wallpapers
  - Paper, fleece, textile and synthetic wallpapers
  - Use only adhesives made of methyl cellulose according to Code of Practice no. 16 "Technische Richtlinien für Tapezier- und Spannarbeiten innen" <sup>2)</sup> released by the Bundesausschuss Farbe und Sachwertschutz.
- Plaster and filler materials
  - Top coats (e.g. Noblo, Raumklima Spritzputz spray plaster, Rotkalk Filz)
  - Full surface plaster (e.g. Spritzspachtel Plus).
  - Application of plaster layers only in conjunction with Fugendeckstreifen Kurt joint tape.
- Decorative coats
  - Dispersion paint (e.g. Intol E.L.F., Malerweiss E.L.F.),
  - Silicate-based emulsion paints with suitable primer.
  - Others on request
- Ceramic coverings (e.g. tiles)
  - Tile weights up to 25 kg/m<sup>2</sup> (one-sided) with a max. surface per tile of 1800 cm<sup>2</sup> (e.g. 60 x 30 cm) have proven to be uncritical (compare to code of practice 8:2019-12 Partition heights of lightweight partitions <sup>1)</sup>).

#### Unsuitable coatings and linings

- Alkaline coats such as lime, water glass paints and silicate-based paints.

<b>Notes</b>	After wallpapering or after application of plasters, quick drying must be ensured through adequate airing.  Other coatings or layers and vapour barriers up to about 0.5 mm thickness as well as claddings (with the exception of sheet steel), do not have any influence on the technical fire resistance classification of the Knauf Bullet-Resistant Partitions.
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1) Issued by the German Bundesverband der Gipsindustrie e. V.

2) Issued by the German Bundesausschuss Farbe und Sachwertschutz



### Information on sustainability of Knauf bullet-resistant partitions

Building assessment systems ensure the sustainable quality of buildings and constructional structures by a detailed assessment of ecological, economic, social, functional and technical aspects.

In Germany the following certification systems are of particular relevance:

- DGNB System  
German seal of approval for environmentally sustainable building from the DGNB (German association for environmentally sustainable building)
- BNB  
(Bewertungssystem Nachhaltiges Bauen - Quality rating system for environmentally sustainable building)
- LEED  
(Leadership in Energy and Environmental Design).

Knauf products and Knauf Bullet-Resistant Partitions can positively influence many of these criteria.

#### DGNB/BNB

##### *Ecological quality*

- Criterion: Risks for the local environment  
The relevant environmental data are contained in the EPD for gypsum products

##### *Economic quality*

- Criterion: Building related life-cycle costs  
Cost-effective Knauf Drywalling

##### *Sociocultural and functional quality*

- Criterion: Space efficiency  
Slim, floor-space enhancing Knauf Bullet-Resistant Partitions
- Criterion: Suitability for conversion  
Flexible Knauf Drywalling

##### *Technical quality*

- Criterion: Sound insulation  
Exceeding the demands of the standard with Knauf sound protection
- Criteria: Ease of dismantling and recycling  
Knauf Drywalling is fully compliant

#### LEED

##### *Materials and resources*

- Credit: Recycled Content  
Recycled content in Knauf boards
- Credit: Regional Materials  
Short transport routes provided by the extensive network of Knauf manufacturing facilities



Videos for Knauf systems and products can be found under the following link:

[www.youtube.com/knauf](http://www.youtube.com/knauf)



Find the ideal systems for your requirements!  
[knauf.de/systemfinder](http://knauf.de/systemfinder)



The iPad App Knauf Infothek now provides all the current information and documents from Knauf Gips KG at any time and in every location in a clear and comfortable way.

[Knauf Infothek](#)

#### Knauf Direct

Technical Advisory Service:

▶ [knauf-direkt@knauf.de](mailto:knauf-direkt@knauf.de)

▶ [www.knauf.de](http://www.knauf.de)

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